

## **HR-209, Pavement Surface on Macadam Base – Adair County**

**Key Words:** Macadam stone, Base, D-cracking, Limestone, PCC, ACC, Paving

### **ABSTRACT**

The quality and availability of aggregate for PCC stone varies across Iowa. Southwest Iowa is one area of the state that is short of quality aggregates. The concrete stone generally available in the area is limestone from the Argentine or Winterset ledges with an overburden of up to 150 feet. This concrete stone is classified as Class 1 durability and is susceptible to "D" cracking. In addition, the general engineering soil classification rates the soils of southwest Iowa as having the poorest subgrade bearing characteristics in the state<sup>1</sup>.

The combination of poor soils and low quality aggregate has contributed to premature deterioration of many miles of PCC pavement. Research project HR-209 was initiated in 1979 to explore alternative construction methods that may produce better pavements for southwest Iowa.

The objectives of the research project were:

1. To determine the feasibility, economics and performance of a roadway constructed by placing Portland cement concrete and asphaltic concrete on an open-graded macadam base while developing design criteria by varying the thickness of the searing surface.
2. To determine if the macadam base is effective in reducing or eliminating the D-cracking deterioration of concrete produced with crushed limestone exhibiting poor durability.
3. To determine the effect of placing asphaltic concrete directly on the macadam base, thus eliminating chokestone.

Conclusions:

1. Macadam stone base can be quickly and easily constructed using readily available construction equipment.
2. Significant allowance should be made for material overruns when placing either PCC or ACC pavement on macadam without chokestone (215 cy per mile for PCC and 215 tons per mile for ACC).
3. The quarry must be in close proximity to the project (within 10 to 20 miles) for macadam stone base to be economically practical.
4. Provisions must be made to drain water from the macadam base to the ditches at low points in the roadway.

5. Five to six inches of macadam stone base did provide some structural support on this project; however, the main function of macadam stone is to allow water to easily drain away from the roadway.

#### Recommendation

The major objective of the project was to determine the effect of macadam stone base on D-Cracking susceptible PCC pavement. Annual evaluation of the project should continue for an additional five years to determine the effects of macadam stone base.